Where does Salmonella hide after grinding of meat?

Hansen, Tina Beck; Møller, Cleide Oliveira de Almeida; Hansen, Solvej Katrine Holm; Andersen, Bettina; Aabo, Søren

Publication date:
2016

Document Version
Publisher's PDF, also known as Version of record

Where does *Salmonella* hide after grinding of meat?

Tina Beck Hansen[1], Cleide Oliveira de Almeida Møller[1,2], Solvej Katrine Holm Hansen[1], Bettina Andersen[1] & Søren Aabo[1]

[1] ***National Food Institute, Technical University of Denmark***; [2] ***Department of Food Science, University of Copenhagen***

Background and hypothesis

Transfer of *Salmonella* during grinding of the first pieces of meat decrease rapidly after which the decrease become markedly slower (Fig. 1). This is explained as a biphasic transfer from two distinct environmental loci in the grinder (Fig. 2). In one locus (E1), *Salmonella* is hypothesized to be loosely attached supporting a fast transfer. In another locus (E2), *Salmonella* is hypothesized to be tightly attached making the transfer slow. The objective was to verify this hypothesis.

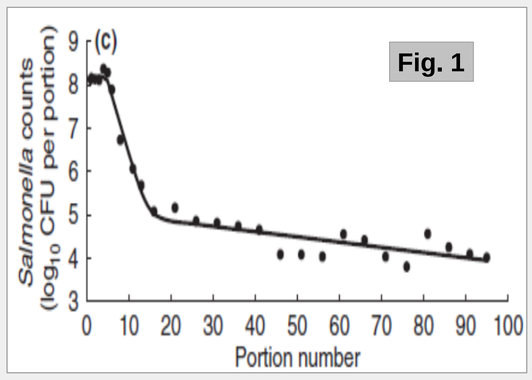


Fig. 1

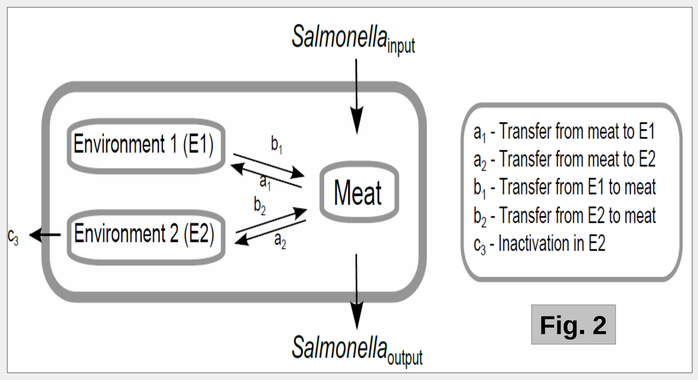
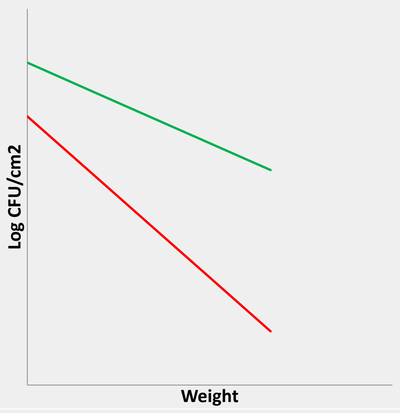


Fig. 2

ATTACHMENT – identification of loci in the meat grinder with slow or fast *Salmonella* transfer

Grouping of loci based on multiple linear regression analysis		Generic transfer from loci with loose and tight *Salmonella* attachment
Group 1 (fast)	➢ Feed pan ➢ Cylinder, out ➢ Grinder plate (ring) ➢ Grinder plate (knife) ➢ Knife ➢ Worm	
Group 2 (slow)	➢ Feed pan, out ➢ Ring ➢ Cylinder, in ➢ Cylinder, back	

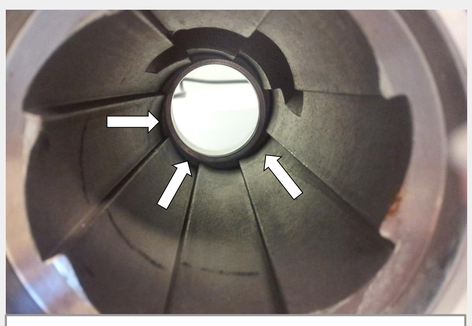
Meat grinder used in the study
RED no.: loci with loosely attached *Salmonella*
GREEN no.: loci with tightly attached *Salmonella*

DETACHMENT - number of *Salmonella* (log CFU/cm²) recovered from different loci in the meat grinder

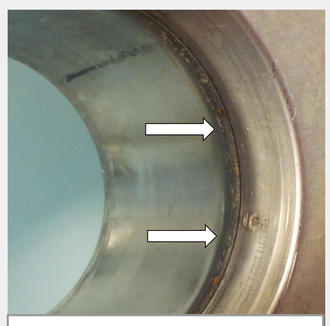
Swabbed loci		Rayon tipped swab method		Toothbrush swab method		t-test, paired (*P*-value)
		Avg.	S.D.	Avg.	S.D.	
2, 3	Feed pan, out	4.47	0.646	4.62	0.478	0.48
4, 5, 6	Cylinder, out	3.82	0.811	4.43	0.305	0.25
12, 13	Cylinder, in	4.56	0.637	4.92	0.546	0.09
7, 8	Grinder plate, outside	4.27	0.136	4.25	0.270	0.77
9, 10	Grinder plate, inside	3.92	0.683	3.99	0.425	0.78
15, 16	Ring	2.77	0.558	3.06	0.578	0.01

Conclusions – attachment

- Difference between environments likely caused by physical structure
- Irreversible adhesion to the grinder could take place – especially in loci from group 2
- Recovered level of *Salmonella* likely much lower than actual level – dependent on recovery method?



Cylinder, in/back – dead leg



Feed pan, out – crevices

Conclusions – detachment

- Difference between recovery methods depended on physical structure
- Toothbrush swab method recovered higher levels of *Salmonella* – especially in loci from group 2
- Recovered level of *Salmonella* increased 10-fold with the optimized recovery method using toothbrush and mild detergent